

CLAIMS

What is being claimed is:

1. A light emitting device comprising:
a structure comprising:
a light emitting region disposed between a region of first conductivity type and a region of second conductivity type; and
a distributed Bragg reflector;
a first contact electrically connected to the region of first conductivity type;
a second contact electrically connected to the region of second conductivity type; and
a metal layer having a reflectivity to light emitted by the light emitting region greater than 75%;
wherein the first and second electrical contacts are formed on a same side of the structure.
2. The device of claim 1 wherein the light emitting region is disposed between the distributed Bragg reflector and the metal layer.
3. The device of claim 1 wherein the metal layer is one of the first and second contacts.
4. The device of claim 1 wherein the metal layer comprises a metal selected from the group of Ag, Au, Al, Pt, Pd, Re, Ru, Rh, In, Cr, and alloys thereof.
5. The device of claim 1 wherein the distributed Bragg reflector has a reflectivity to light emitted by the light emitting region between about 60% and about 90%.
6. The device of claim 1 wherein the distributed Bragg reflector and the metal layer form a resonant cavity, and light generated by the light emitting region is extracted from the resonant cavity through the distributed Bragg reflector.
7. The device of claim 1 wherein the distributed Bragg reflector and the metal layer form a resonant cavity, and a distance between the metal layer and the distributed Bragg reflector is an integer multiple of $\lambda/2$, where λ is the wavelength of light emitted by the light emitting region in the resonant cavity.
8. The device of claim 1 wherein the distributed Bragg reflector is disposed between the first contact and the region of first conductivity type.
9. The device of claim 8 wherein the first contact comprises a ring.
10. The device of claim 8 wherein the first contact comprises a mesh.

11. The device of claim 1 wherein the first and second electrical contacts are formed on a first side of the structure, the device further comprising:
a transparent window region attached to a second side of the structure opposite the first side.
12. The device of claim 11 wherein the distributed Bragg reflector is disposed between the region of second conductivity type and the transparent window region.
13. The device of claim 11 wherein light generated by the light emitting region is extracted from the device through the transparent window region.
14. The device of claim 11 wherein the metal layer forms the first contact.
15. The device of claim 1 wherein the first and second electrical contacts are formed on a first side of the structure, the device further comprising:
a host substrate attached to a second side of the structure opposite the first side, wherein the host substrate is attached to the second side of the structure by the metal layer.
16. The device of claim 1 wherein the metal layer has a reflectivity to light emitted by the light emitting region greater than 80%.
17. The device of claim 1 wherein the distributed Bragg reflector has a reflectivity to light emitted by the light emitting region between about 75% and about 85%.
18. A light emitting device comprising:
a structure comprising:
a light emitting region disposed between a region of first conductivity type and a region of second conductivity type; and
a distributed Bragg reflector;
a first contact electrically connected to the region of first conductivity type; and
a second contact electrically connected to the region of second conductivity type;
wherein:
one of the first and second contacts comprises a metal layer having a reflectivity to light emitted by the light emitting region greater than 75%; and
the other of the first and second contacts extends over at least a portion of a top surface of the structure and at least a portion of a side surface of the structure.
19. The device of claim 18 further comprising a host substrate attached to a bottom surface of the structure.
20. The device of claim 19 wherein the host substrate is attached to the bottom surface of the structure by the metal layer.

21. The device of claim 19 wherein the host substrate comprises:
a first conductive region electrically connected to the metal layer; and
a second conductive region electrically connected to the contact extending over at least portions of the top and side surfaces of the structure.
22. The device of claim 19 wherein the host substrate comprises silicon.
23. The device of claim 18 wherein the distributed Bragg reflector and the metal layer form a resonant cavity, and light generated by the light emitting region is extracted from the resonant cavity through the distributed Bragg reflector.
24. The device of claim 18 wherein the distributed Bragg reflector and the metal layer form a resonant cavity, and a distance between the metal layer and the distributed Bragg reflector is an integer multiple of $\lambda/2$, where λ is the wavelength of light emitted by the light emitting region in the resonant cavity.